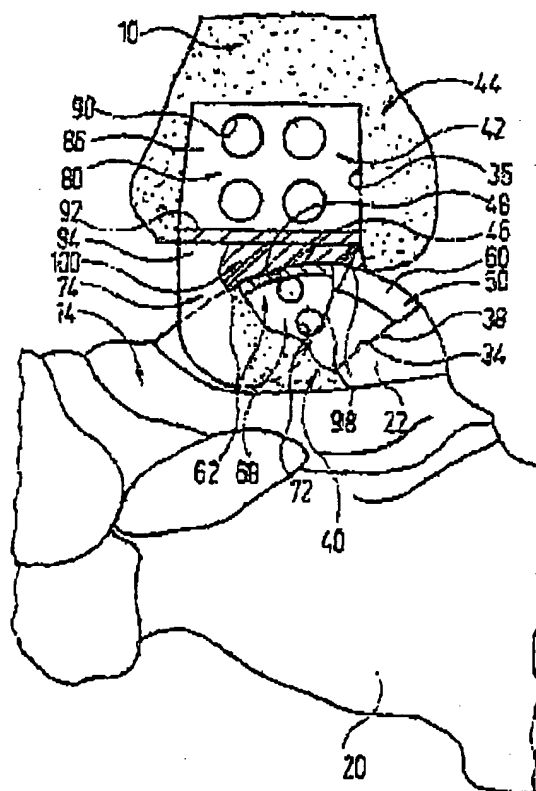


Prosthetic top ankle joint has two parts, two joint surfaces, anchor sections with anchor elements

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Abstract of DE19949890

The prosthesis has a first part (44) joined to the shin-bone (10) and has an underneath first joint surface (48). A second prosthesis part (40) is joined to the ankle-bone (14) and has a second joint surface (46) matching the first joint surface. The two joint surfaces each have at least one anchor section (38;42) possessing at least one anchor element (82;76-82). The anchor section is fixed into the shin or ankle bones with or without cement.



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- 5 The joint section 22 forms, together with the joint socket 24, the ankle joint, whose joint axis is substantially perpendicular to the plane of the drawing in Fig. 1.
- 10 Further joint surfaces provided on the underside of the ankle bone 10 form, together with the matching joint surfaces of the calcaneal bone 20 and of the navicular bone 18, the talo-calcaneonavicular joint, whose joint axis extends substantially in the longitudinal
- 15 direction of the plantar arch, so that the foot can be turned about a corresponding roll axis.

The ankle joint often loses its function, particularly through degeneration of the layers of cartilage supported by the joint section 22 and the joint socket 24. To manage the pain associated with this loss of function and to prevent stiffening of the joint, the ankle joint formed by the joint section 22 and the joint socket 24 can be replaced by an artificial ankle

25 joint.

For this purpose, the joint socket 24 is removed, as is shown in Fig. 2. Several cavities 34 of V-shaped cross section are then formed in the bone end using a chisel.

30 This can also be done in one step using a multi-disk milling cutter, which will be described in more detail below. The cavities here have longitudinal axes extending in the ventral to dorsal direction, although these can also extend in the lateral direction, if so

35 desired.

The layer of cartilage is removed from the joint socket 22, and cavities are cut into the joint section 22 prepared in this way (two cavities in the example shown

here).

An anchoring section 38 of a lower prosthesis part 40
is then inserted into the cavities 34 thus formed, and
5 an anchoring section 42 of an upper prosthesis part 44
is inserted into cavities 36 formed in the lower end of
the tibia 10.

The two prosthesis parts 40, 44 provide joint surfaces
10 46, 48 which will be described in greater detail below
and move on one another with slight friction.

To promote incorporation of the anchoring sections 38,
42 in the spongy substance of the ankle bone 14 and of
15 the tibia 10, respectively, the surfaces of the
anchoring sections are coated, before insertion, with
an agent that promotes bone growth. This can be a
biomorphological protein (BMP), e.g. the commercial
product sold under the reference BMP 7, or an operative
20 protein (OP), as is sold under the reference OP1.

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English translation of column 5, lines 46 to 58:

5 The prosthesis part 44 is a forged piece of titanium
which has been subjected to mechanical finishing of the
joint surface 46, and in which the through-openings 72
have been formed by drilling. The intermediate product
thus obtained is provided, at least on its anchoring
walls 62, 64, with a microstructure created by
10 sandblasting and/or shotpeening and/or etching. This
structure involves micro irregularities within the
range of a few tenths of millimeters. In this way, it
is possible to achieve good adherence of spongy
substance that has grown onto the surfaces of the
15 anchoring walls 62, 64. It is also preferable for the
entire inner face of the joint cap 50 to be provided
with such a microstructure.

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English translation of column 5, lines 31 to 63:

5 The prosthesis described above for the ankle joint is
implanted in the following manner:

First, cartilage is resected from the joint section 22
of the ankle bone 14. This is done using a template
corresponding to the edge contour of the joint surface
10 46 of the lower prosthesis part 46. The cavities 34 are
then formed in the spongy substance volume of the ankle
bone, for example using a chisel.

After the cavities 34 have been produced, the
15 prosthesis part 40, coated on the anchoring walls 62,
64 and on the inner face of the joint cap 50 with BMP7,
is inserted into the top of the prepared ankle bone 14.
This can be done by simply pushing the anchoring walls
62, 64 vertically into the cavities 34.

20 Similarly, the joint socket 24 is resected. The
resected bones are shown in Figure 2.

The prosthesis part 44 is then coated with BMP7 on the
25 inner face of its joint cap 54 and in the area of the
anchoring walls 76 to 82, and the insert 100 is clipped
into the joint cap 74. The joint surface 48 carried by
the insert 100 and the joint surface 46 carried by the
prosthesis part 40 are then brought into contact with
30 one another, and the surgical wound is closed.

After they have become incorporated, the prosthesis
parts 40 and 44 represent an artificial ankle joint
which, in terms of its geometrical and mechanical
35 properties, is similar to a natural ankle joint. Since
the anchor walls 62, 64 and 76, 78, 80, 82 become
incorporated in the spongy substance and thus enter
into a very intimate and load-bearing union with the
bones assigned to the prosthesis parts (namely tibia

and ankle bone), such an ankle joint has a long useful life.